

ABSTRACT

A method for making a tunnel valve head with a flux guide, a tunnel valve sensor having an isolated flux guide, and a magnetic storage system using a tunnel valve sensor having an isolated flux guide is disclosed. The tunnel valve sensor is created by forming a tunnel valve at a first shield layer, the tunnel valve comprising a free layer distal to the first shield layer, depositing a first insulation layer over the first shield layer and around the tunnel valve, depositing a flux guide over the first insulation layer and coupling to the tunnel valve at the free layer, covering the flux guide with a second insulation layer and forming a second shield layer over the second insulation, wherein the flux guide and the free layer are physically isolated by the first and second insulation layers to prevent current shunts therefrom. The structure achieves physical connection between the flux guide and the free layer and insulates the flux guide from the shields. By separating the flux guide and the free layer from the shields, the shunting of current is prevented.